Remarks

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 1-42 are pending in the application, with claims 1, 16, 17, and 36 being the independent claims. Claims 1, 16, 17, 27, 30, and 36 are sought to be amended. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding rejections and that they be withdrawn.

Rejections under 35 U.S.C. § 103

Claims 1, 3, 5, 8, 11, 13, 14 and 16

In paragraph 6 of the Office Action, claims 1, 3, 5, 8, 11, 13, 14 and 16 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,963,557 to Eng ("Eng") in view of U.S. Patent No. 6,108,713 to Sambamurthy *et al.* ("Sambamurthy"). For at least the reasons set forth below, Applicants respectfully traverse this rejection.

Applicants assert that the Office Action does not establish a *prima facie* case of obviousness for at least the reason that the cited references do not teach each and every feature of these claims.

Claim 1, as presently amended, recites:

> A cable modem termination system for a cable plant comprising:
> a burst receiver for processing data signals having physical layer parameters that control the manner in which the data signals are transmitted on an upstream channel of the cable plant;
> a transmitter for sending messages on a downstream channel of the cable plant to cable modems; and

> *a monitoring circuit for collecting packet based statistics representative of the channel quality of the upstream channel, the monitoring circuit sending a message to the transmitter for the cable modems to change a physical layer parameter responsive to the collected statistics and to the burst receiver to process data signals based on the changed physical layer parameter, wherein channel quality is an ability of a channel to transmit data reliably thereon, such that a higher quality channel transmits data reliably at a higher data rate than a lower quality channel.*
>
> (*See* claim 1, *emphasis added*)

Eng is directed to a method and system for enabling point-to-point and multicast communication in a network using three types of communication channels—namely, one or more upstream payload channels, one or more upstream control channels and one or more downstream channels. *See* Eng, Abstract. Eng describes a headend controller that includes a collision detector 290, a mini-slot collection status queue 294, and a contention resolution circuit 234. *See* Eng, FIG. 14. The collision detector 290 receives demodulated control packets from an upstream control channel. Eng, col. 16, ll. 63-67. If, based on the control packets, the collision detector 290 detects a collision between reservation requests of competing subscriber stations[1], then the collision detector 290 inputs collision status information to collision status register 294. Contention resolution circuit 234, which is connected to collision status register 294, generates a control packet message when a collision occurs. Furthermore, according to Eng:

> The contention resolution circuit 234 may also maintain statistics on the number of collisions, which statistics may in turn be used to control when to broadcast a start available mini-slot for new reservation requests or how many mini-slots to make available in a group of mini-slots for new reservation requests. The contention resolution circuit 234 therefore controls how many residual mini-slots are available for retransmitting collided reservation request packets.

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[1] In Eng, a "collision" is defined as an instance where more than one subscriber station attempts to write a reservation request control packet into the same mini-slot on the upstream channel. *See* Eng, col. 4, ll. 33-67.

Eng, col. 17, ll. 60-67.

In Eng, the statistics on the number of collisions maintained by the contention resolution circuit 234 have nothing to do with channel quality. Instead, the statistics merely represent the amount of traffic on the upstream control channel (i.e., the number of active subscriber stations competing for mini-slots on the upstream control channel). The number of collisions on a channel has nothing to do with transmitting data reliably. Moreover, the number of collisions on a channel has nothing to do with the data rate at which channels transmit data. Accordingly, Eng does not teach or suggest *a monitoring circuit for collecting packet based statistics representative of the* ***channel quality*** *of the upstream channel, ... wherein channel quality is an ability of a channel to transmit data reliably thereon, such that a higher quality channel transmits data reliably at a higher data rate than a lower quality channel*, as set forth in Applicants' claim 1, as amended. Moreover, Eng does not teach or suggest *the monitoring circuit sending a message to the transmitter for the cable modems to change a physical layer parameter responsive to the collected statistics and to the burst receiver to process data signals based on the changed physical layer parameter*, as set forth in Applicants' claim 1, as amended.

The foregoing deficiencies of Eng with respect to claim 1 are not remedied by the teachings of Sambamurthy. Sambamurthy describes an Ethernet MAC in which a Super MAC Management block 117 can synchronize the transmit/receive protocols, and in particular the communication speed, of the transmitter and receiver. *See* Sambamurthy, col. 13, ll. 1-13. Like Eng, Sambamurthy does not teach or suggest *a monitoring circuit for collecting packet based statistics representative of the* ***channel quality*** *of the upstream channel, ... wherein channel quality is an ability of a channel to transmit data reliably thereon, such that a higher quality channel transmits data reliably at a higher*

data rate than a lower quality channel, as set forth in Applicants' claim 1, as amended. Instead, Sambamurthy discusses maintaining statistics relating to processing events occurring within the MAC, although Sambamurthy does not explain how those statistics are used. Sambamurthy, col. 11, ll. 2-8. Furthermore, like Eng, Sambamurthy does not teach or suggest *the monitoring circuit sending a message to the transmitter for the cable modems to change a physical layer parameter responsive to the collected statistics and to the burst receiver to process data signals based on the changed physical layer parameter*, as set forth in Applicants' claim 1, as amended. In particular, Sambamurthy is silent in regard *sending a message to the transmitter for the cable modems to change a physical layer parameter*, and although Sambamurthy does discuss changing the communication speed of the MAC transmitter and receiver, it does so not in response to collected statistics but instead utilizes an auto-negotiation technique described in IEEE 802.3(u). Sambamurthy, col. 13, ll. 8-13.

Thus, Applicants assert that independent claim 1, as amended, is patentable over Eng and Sambamurthy, alone or in any rational combination. Therefore, for at least the reasons set forth above, reconsideration and withdrawal of the rejection of independent claim 1 is respectfully requested.

Furthermore, claims 3, 5, 8, 11, 13 and 14, which depend from independent claim 1, also distinguish over Eng and Sambamurthy, alone or in any rational combination, for reasons similar to those set forth above with respect to independent claim 1, as amended, and further in view of their own features.

Claim 16, as currently amended, recites:

> A headend terminal for a bidirectional asymmetric, transmission system having a downstream channel that broadcasts data from the headend terminal to a plurality of subscriber terminals and an upstream channel that unicasts data from

the individual subscriber terminals to the headend terminal, the headend terminal comprising:

a burst receiver for processing data signals having physical layer parameters that control the manner in which the data signals are transmitted on the upstream channel;

a transmitter for sending messages on the downstream channel; and

a monitoring circuit for collecting statistics about the data signals transmitted on the upstream channel, the statistics representative of the channel quality of the upstream channel, the monitoring circuit sending a message to the transmitter for the cable modems to change a physical layer parameter responsive to the collected statistics and to the burst receiver to process data signals based on the changed physical layer parameter, wherein channel quality is an ability of a channel to transmit data reliably thereon, such that a higher quality channel transmits data reliably at a higher data rate than a lower quality channel.

(*See* claim 16, *emphasis added*)

Eng does not teach or suggest each of the foregoing features of independent claim 16, as amended. For example, Eng does not teach or suggest *a monitoring circuit for collecting statistics about the data signals transmitted on the upstream channel, the statistics representative of the* ***channel quality*** *of the upstream channel, ... wherein channel quality is an ability of a channel to transmit data reliably thereon, such that a higher quality channel transmits data reliably at a higher data rate than a lower quality channel*, as set forth in Applicants' claim 16, as amended. As discussed above in reference to claim 1, the collision statistics maintained by the contention resolution circuit 234 in Eng are indicative of the amount of traffic on the upstream control channel and have nothing to do with "channel quality".

Furthermore, Eng does not teach or suggest *the monitoring circuit sending a message to the transmitter for the cable modems to change a physical layer parameter responsive to the collected statistics and to the burst receiver to process data signals based on the changed physical layer parameter,* as set forth in Applicants' claim 16, as amended.

The foregoing deficiencies of Eng with respect to claim 16 are not remedied by the teachings of Sambamurthy. Like Eng, Sambamurthy does not teach or suggest *a monitoring circuit for collecting statistics about the data signals transmitted on the upstream channel, the statistics representative of the* ***channel quality*** *of the upstream channel, ... wherein channel quality is an ability of a channel to transmit data reliably thereon, such that a higher quality channel transmits data reliably at a higher data rate than a lower quality channel*, as set forth in Applicants' claim 16, as amended. Instead, as noted above in reference to claim 1, Sambamurthy discusses maintaining statistics relating to processing events occurring within the MAC, although Sambamurthy does not explain how those statistics are used. Furthermore, like Eng, Sambamurthy does not teach or suggest *the monitoring circuit sending a message to the transmitter for the cable modems to change a physical layer parameter responsive to the collected statistics and to the burst receiver to process data signals based on the changed physical layer parameter,* as set forth in Applicants' claim 16, as amended. In particular, and as noted above in reference to claim 1, Sambamurthy is silent in regard *sending a message to the transmitter for the cable modems to change a physical layer parameter*, and although Sambamurthy does discuss changing the communication speed of the MAC transmitter and receiver, it does not do so in response to collected statistics but instead utilizes an auto-negotiation technique described in IEEE 802.3(u).

Thus, Applicants assert that independent claim 16, as amended, is patentable over Eng and Sambamurthy, alone or in any rational combination. Therefore, for at least the reasons set forth above, reconsideration and withdrawal of the rejection of independent claim 16 is respectfully requested.

Claims 2, 4, 6, 7, 9, 10, 12, and 15

The Office Action rejected:

- claim 2 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Eng and Sambamurthy as applied to claim 1 and further in view of U.S. Patent No. 5,995,916 to Nixon *et al.* ("Nixon"),

- claims 4, 6, and 7 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Eng and Sambamurthy as applied to claim 1 and further in view of U.S. Patent No. 5,666,358 to Paratore *et al.* ("Paratore"),

- claim 9 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Eng and Sambamurthy as applied to claim 1 and further in view of U.S. Patent No. 5,206,864 to McConnell ("McConnell"),

- claim 10 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Eng and Sambamurthy as applied to claim 1 and further in view of U.S. Patent No. 6,434,199 to Desrosiers *et al.* ("Desrosiers"),

- claim 12 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Eng and Sambamurthy as applied to claim 1 and further in view of U.S. Patent No. 6,438,174 to Isaksson *et al.* ("Isaksson"), and

- claim 15 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Eng and Sambamurthy as applied to claim 1 and further in view of U.S. Patent No. 6,246,713 to Mattisson ("Mattisson").

See Office Action at ¶¶ 7-12. For at least the reasons set forth below, Applicants respectfully traverse these rejections.

Each of claims 2, 4, 6, 7, 9, 10, 12 and 15 depends from claim 1 and therefore includes the features of "*a monitoring circuit for collecting packet based statistics representative of the* ***channel quality*** *of the upstream channel, ... wherein channel quality is an ability of a channel to transmit data reliably thereon, such that a higher quality channel transmits data reliably at a higher data rate than a lower quality channel*" and "*the monitoring circuit sending a message to the transmitter for the cable modems to change a physical layer parameter responsive to the collected statistics and*

to the burst receiver to process data signals based on the changed physical layer parameter." As noted above, neither Eng nor Sambamurthy, nor any rational combination thereof, teaches or suggests either of these features. Furthermore, none of the additional references cited by the Examiner in rejecting these dependent claims provides the missing teachings or suggestions. Therefore, the Office Action does not establish a *prima facie* case of obviousness with respect to any of dependent claims 2, 4, 6, 7, 9, 10, 12 or 15. For at least the reasons set forth above, Applicants respectfully request reconsideration and withdrawal of the rejections of these claims.

Claims 17, 20 and 32

In paragraph 13 of the Office Action, claims 17, 20 and 32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,696,765 to Safadi ("Safadi") in view of Eng. For at least the reasons set forth below, Applicants respectfully traverse this rejection.

Applicants assert that the Office Action does not establish a *prima facie* case of obviousness for at least the reason that the cited references do not teach each and every feature of these claims.

Claim 17, as presently amended, recites:

> A method for transmitting data over a cable system in an upstream direction to a headend from a plurality of subscriber stations located at different distances from the headend such that the transmission paths to the headend are different, the method comprising the steps of:
>
> establishing an upstream channel from the subscriber stations to the headend;
>
> *monitoring at the headend the channel quality of the upstream channel;*
>
> establishing a downstream channel from the headend to the subscriber stations;
>
> *transmitting to the subscriber stations over the downstream channel a command to change the mode of transmission to the headend over the upstream channel if the monitored channel quality fails to meet a prescribed threshold level;*

> receiving the command at the subscriber stations; and
> *transmitting data over the upstream channel from the subscriber stations to the headend in accordance with the changed mode of transmission after receipt of the command, wherein channel quality is an ability of a channel to transmit data reliably thereon, such that a higher quality channel transmits data reliably at a higher data rate than a lower quality channel.*
>
> (*See* claim 17, *emphasis added*)

Safadi is directed to a hybrid MAC system that optimizes the resources of a CATV communication network depending upon the applications and services requested. *See* Safadi, col. 4, ll. 27-30. In Safadi, the MAC system analyzes services requested from a settop terminal (STT) and determines the best MAC component for transmitting upstream based on the resources required by the service and the available network resources. Safadi, col. 3, ll. 44-49. One MAC component disclosed by Safadi performs "random slot reservation-dynamic slot allocation" (RSR-DSA). In accordance with RSR-DSA, a STT may request a time slot in the upstream channel over multiple cycles. Safadi, col. 17, ll. 57-59. If network controller 62 grants the request, it sends an acknowledgement to the requesting STT and a message to all other STTs that the particular time slot has become unavailable. Safadi, col. 17, l. 64-col. 18, l. 1. The network controller 62 must then monitor the channel activity to determine whether the requesting STT has terminated communications, thereby releasing the reserved time slot, so that it can re-assign the time slot to another STT. As noted in Safadi:

> If, while monitoring channel activity (step 412), the network controller 62 determines that there is too much activity over a particular channel (step 320), the network controller 62 adjusts the number of time slots 412, and increases the size of the frame 410, or allocates additional frequencies (step 322). Transmission efficiency may also be increased by performing ranging which accounts for propagation delays.

Safadi, col. 18, ll. 12-18.

Safadi does not teach or suggest each of the foregoing features of claim 17, as amended. For example, Safadi does not teach or suggest *monitoring at the headend the* ***channel quality*** *of the upstream channel, ... wherein channel quality is an ability of a channel to transmit data reliably thereon, such that a higher quality channel transmits data reliably at a higher data rate than a lower quality channel*, as set forth in Applicants' claim 17, as amended. In Safadi, the network controller 62 monitors the upstream channel activity to determine if there is too much activity on the channel. However, the amount of activity on the upstream channel is not the same as the "channel quality" of the upstream channel, as recited in claim 17, as amended. The term "channel quality" is clearly defined in amended claim 17 to be *an ability of a channel to transmit data reliably thereon, such that a higher quality channel transmits data reliably at a higher data rate than a lower quality channel.* Information relating to the amount of activity on the upstream channel as described in Safadi has nothing to do with the ability of the channel to transmit data reliably at higher data rates versus lower data rates. Thus, Safadi does not teach or suggest *monitoring at the headend the* ***channel quality*** *of the upstream channel, ... wherein channel quality is an ability of a channel to transmit data reliably thereon, such that a higher quality channel transmits data reliably at a higher data rate than a lower quality channel*, as set forth in Applicants' claim 17, as amended.

Furthermore, the Office Action concedes in paragraph 13 that Safadi does not teach or suggest "transmitting to the subscriber stations over the downstream channel a command to change the mode to the headend over the upstream channel ...." More specifically, Applicants assert that Safadi does not teach or suggest *transmitting to the subscriber stations over the downstream channel a command to change the mode of transmission to the headend over the upstream channel if the monitored channel quality*

fails to meet a prescribed threshold level, as set forth in Applicants' claim 17, as amended. In Safadi, if the network controller 62 determines that there is too much activity on an upstream channel, it can adjust the number of time slots, increase frame size or allocate additional frequencies on the upstream channel, as well as perform ranging. However, none of these activities involves *transmitting to the subscriber stations over the downstream channel a command to change the mode of transmission to the headend over the upstream channel if the monitored channel quality fails to meet a prescribed threshold level*, as set forth in Applicants' claim 17.

The foregoing deficiencies of Safadi with respect to amended claim 17 are not remedied by the teachings of Eng. For example, Eng does not teach or suggest *monitoring at the headend the* ***channel quality*** *of the upstream channel, ... wherein channel quality is an ability of a channel to transmit data reliably thereon, such that a higher quality channel transmits data reliably at a higher data rate than a lower quality channel*, because Eng merely maintains statistics relating to the level of traffic on the upstream control channel. Furthermore, Eng does not teach *transmitting to the subscriber stations over the downstream channel a command to change the mode of transmission to the headend over the upstream channel if the monitored channel quality fails to meet a prescribed threshold level*, as set forth in Applicants' claim 17. As discussed above in reference to claims 1 and 16, Eng teaches increasing or decreasing the time interval allocated on the upstream control channel for receiving new reservation requests from the subscriber stations in response to the collision statistics. This has nothing to do with *transmitting to the subscriber stations over the downstream channel a command to change the mode of transmission to the headend over the upstream channel*

if the monitored channel quality fails to meet a prescribed threshold level, as set forth in Applicants' claim 17.

Thus, Applicants assert that independent claim 17, as amended, is patentable over Safadi and Eng, alone or in any rational combination. Therefore, for at least the reasons set forth above, reconsideration and withdrawal of the rejection of independent claim 17 is respectfully requested.

Furthermore, claims 20 and 32, which depend from independent claim 17, also distinguish over Safadi and Eng, alone or in any rational combination, for reasons similar to those set forth above with respect to independent claim 17, as amended, and further in view of their own features.

Claims 18, 19, 21-29 and 33

The Office Action rejected:

- claims 18 and 19 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Safadi and Eng as applied to claim 17 and further in view of U.S. Patent No. 5,513,029 to McCarthy ("McCarthy"),

- claim 21 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Safadi and Eng applied to claim 17 and further in view of Nixon,

- claims 22 and 24-26 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Safadi and Eng as applied to claim 17 and further in view of Paratore,

- claim 23 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Safadi and Eng as applied to claim 17 and further in view of Sambamurthy,

- claims 27, 28 and 29 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Safadi and Eng as applied to claim 17 and further in view of U.S. Patent No. 6,480,477 to Treadaway *et al.* ("Treadway"), and

- claim 33 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Safadi and Eng as applied to claim 17 and further in view of U.S. Patent No. 5,491,725 to White ("White").

See Office Action at ¶¶ 14-19. For at least the reasons set forth below, Applicants respectfully traverse these rejections.

Each of claims 18, 19, 21-29 and 33 depends from claim 17 and therefore includes the features of "*monitoring at the headend the **channel quality** of the upstream channel, ... wherein channel quality is an ability of a channel to transmit data reliably thereon, such that a higher quality channel transmits data reliably at a higher data rate than a lower quality channel*" and "*transmitting to the subscriber stations over the downstream channel a command to change the mode of transmission to the headend over the upstream channel if the monitored channel quality fails to meet a prescribed threshold level.*" As noted above, neither Safadi nor Eng, nor any rational combination thereof, teaches or suggests these features. Furthermore, none of the additional references cited by the Examiner in rejecting these dependent claims provides the missing teachings or suggestions. Therefore, the Office Action does not set forth a *prima facie* case of obviousness with respect to any of dependent claims 18, 19, 21-29 and 33. For at least the reasons set forth above, Applicants respectfully request reconsideration and withdrawal of the rejections of these claims.

Claim 36

In paragraph 20 of the Office Action, claim 36 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Eng in view of U.S. Patent No. 5,572,511 to Ouyang *et al.* ("Ouyang"). For the reasons set forth below, Applicants respectfully traverse.

Claim 36, as presently amended, recites:

> A cable modem termination system having an upstream channel shared among a plurality of cable modems and a burst receiver connected to the upstream channel to process physical layer signals transmitted on the upstream channel, *a monitoring circuit for collecting packet based statistics representative of the channel quality of the upstream channel*, the monitoring circuit comprising an input for receiving the physical layer signals from the burst receiver, means for sensing parameters that control the manner of transmission of the physical layer signals, and a plurality of counters for collecting the sensed physical layer parameters, *wherein channel quality is an ability of a channel to transmit data reliably thereon, such that a higher quality channel transmits data reliably at a higher data rate than a lower quality channel.*
>
> (*See* claim 36, *emphasis added*)

Eng does not teach or suggest each of the foregoing features of claim 36, as amended. For example, for reasons set forth above with respect to claims 1 and 16, Eng does not teach or suggest *a monitoring circuit for collecting packet based statistics representative of the channel quality of the upstream channel, ... wherein channel quality is an ability of a channel to transmit data reliably thereon, such that a higher quality channel transmits data reliably at a higher data rate than a lower quality channel.* Ouyang, which is directed to a circuit for performing collision detection on an Ethernet, does not supply the missing teaching.

Thus, Applicants assert that independent claim 16, as amended, is patentable over Eng and Sambamurthy, alone or in any rational combination. Therefore, for at least the reasons set forth above, reconsideration and withdrawal of the rejection of independent claim 36 is respectfully requested.

Claims 37-42

The Office Action rejected:

- claim 37 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Eng and Ouyang as applied to claim 36 and further in view of Nixon,

- claims 38 and 40 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Eng and Ouyang as applied to claim 36 and further in view of Sambamurthy,

- claims 39, 41 and 42 under 35 U.S.C. § 103(a) as being unpatentable over the combination of Eng and Ouyang as applied to claim 36 and further in view of Paratore.

See Office Action at ¶¶ 21-23. For at least the reasons set forth below, Applicants respectfully traverse these rejections.

Each of claims 37-42 depends from claim 36 and therefore includes the feature of "*a monitoring circuit for collecting packet based statistics representative of the channel quality of the upstream channel, ... wherein channel quality is an ability of a channel to transmit data reliably thereon, such that a higher quality channel transmits data reliably at a higher data rate than a lower quality channel.*" As noted above with regard to claim 36, neither Eng nor Ouyang teaches or suggests this feature. Furthermore, none of the additional references cited by the Examiner in rejecting these dependent claims provides the missing teaching or suggestion. Therefore, the Office Action does not set forth a *prima facie* case of obviousness with respect to any of dependent claims 37-42. For at least the reasons set forth above, Applicants respectfully request reconsideration and withdrawal of the rejections of these claims.

Other Matters

The Examiner has objected to claims 30, 31, 34 and 35 as being dependent upon a rejected base claim. Based on the foregoing remarks, Applicants have traversed the

rejection of the base claims from which claims 30, 31, 34 and 35 depend. Therefore, Applicants respectfully request that the objections to claims 30, 31, 34 and 35 be reconsidered and withdrawn.

Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

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